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hours, and it would be difficult in a large telescope to measure that arc of 10'. We find that with the great telescope at Washington we are limited to 4' or 5'. Beyond that we do not get good results. You cannot make the observations without shifting the eyepiece; and I have made up my mind that for the purposes of micrometric observation the diurnal plan would be out of the question.

J. G. Hagen. Referring to the photographic method, there is a difficulty which has not been discussed. The motion of the planet, in taking a photograph, which may require an hour or more, will produce a trail. There is an opportunity to choose between allowing the planet to trail, and allowing the stars to trail. Perhaps the same object, of securing an accurate position for the planet upon the plate, can be attained by interruption of the exposure. The time of the motion can be known within ten seconds; and while the planet, of the 9th magnitude, may be obtained upon the plate, the bright stars may be obtained in a series of dots, each exposure giving an independent determination. Whether these interruptions should be made once in ten seconds or once in a minute is a question for experiment. I merely make the suggestion of a method that may remove the difficulty.

Adjourned.

GEO. C. COMSTOCK,
Secretary.

WASHBURN OBSERVATORY.

SCIENTIFIC BOOKS.

Curing and Fermentation of Cigar Leaf Tobacco.

By OSCAR LOEW. Report No. 59, U. S. Department of Agriculture. 1899. Pp. 34.

Physiological Studies of Connecticut Leaf Tobacco.

By OSCAR LOEW. Report No. 65, U. S. Department of Agriculture. 1900. Pp. 57.

The great and growing importance of the tobacco industry in the United States has led the

Department of Agriculture to undertake an extensive series of investigations, covering the mapping of areas of soil suitable for raising tobacco, studies in fermentation, improvements in breeding and selection, the conditions of growth and manipulation in foreign countries and the question of supplying tobacco to foreign markets. Dr. Loew has been detailed to carry out the chemical part of these researches, and the above-mentioned documents set forth the results thus far obtained by him and by others, and contain an abundance of material, both of scientific interest and practical importance.

From the consumer's standpoint essential constituents of tobacco are: (1) nicotine; (2) certain compounds, the chemical nature of which is wholly unknown, which impart to the leaf its acceptable flavor or aroma, and which differ in quality and quantity in different grades of tobacco. It is upon the latter, rather than upon the nicotine, that the commercial value of the prepared leaf mainly depends. The amount of nicotine is largest in the fresh leaf and undergoes marked diminution during fermentation, while the aromata are developed during the processes to which the tobacco is subjected. There is no apparent relation between the color, aroma and amount of nicotine.

The preparation of tobacco comprises two stages, curing and fermentation or 'sweating,' sometimes supplemented by aging or 'cold sweating.' During the earlier part of the curing stage the cells are still alive, and the resulting changes are physiological, embracing among others the transformation of starch into sugar, and the partial respiratory consumption of the latter, or its transference to another part of the leaf and reconversion into starch. After the death of the cells, the proteolytic and oxidizing enzymes attack much of the protein, fat and tannin, and give rise to changes of color and flavor. The curing stage is followed by one of fermentation, which goes on under the influence of air and moisture, and which is accompanied by a marked rise of temperature. During this stage there is a notable decrease of nicotine, but an improvement of flavor and aroma. The fermentation was ascribed by Suchsland to the action of bacteria, and he attempted to impart to German tobacco the peculiar Havana flavor

by inoculation with pure cultures of bacteria obtained from the Cuban leaf, but without success. Perhaps the most interesting part of Dr. Loew's work is the proof that microbes play no essential part in the normal tobacco fermentation, and that the active agents are oxidizing enzymes. These exist in the green leaf, but are able to manifest their peculiar power of utilizing atmospheric oxygen also during curing and fermentation, when unopposed by the normal physiological processes of the living cells. At least three of these are present—an oxidase, a peroxidase and catalase. The documents contain much interesting information on the subject of oxidizing enzymes, together with speculative discussion of their nature and mode of action, which may or may not stand the test of future developments. With the revival of the study of catalytic phenomena now in progress from the standpoint of physical chemistry it is to be hoped that vegetable physiology will not have to wait long for important light on this still obscure subject.

The documents encourage the hope that the preparation of tobacco, which up to the present has been based on empirical procedure, will before long be conducted in as scientific a manner as is already the case with alcoholic beverages. They also afford an excellent illustration of the manner in which a government department, existing and working solely for practical purposes, is nevertheless compelled to encourage studies of broad scientific interest.

H. N. STOKES.

The Birds of Eastern North America. Part II, Land Birds. Key to the Families and Species. By CHARLES B. CORY. Illustrated. Special edition printed for the Field Columbian Museum, Chicago. Boston. 1899. Small 4to. Pp. 131-387.

Ornithologists, during the rapid growth of popular bird study in the past few years, have witnessed the production of all kinds of bird literature. In the great variety that has been put forth, the general effort has been for untechnical descriptions with sufficient accuracy to stand the test of practical utility. Mr. Cory has accomplished this end to a considerable degree in several of his books. In the 'Land

Birds,' we have neither an exhaustive manual nor a pocket key, but an easy ornithology for beginners in the shape of a profusely illustrated key. It is continuous in pagination with the volume already published on the water birds and the two are obviously intended to be used together, for the useful introductory preface and glossary of the first part are not reprinted in the second. The book begins with a key to families, illustrated by outlined drawings of bills, wings, tails, and feet, and much reduced halftones of species characteristic of the various families. After this comes the key to species, which is the body of the book; then follows a systematic list of both land and water birds, giving in general terms the geographic distribution of each. The species are divided into groups by absolute characters, such as length of wing and distinctive colors, which could not be misconstrued even by the veriest amateur; technical terms are avoided as far as possible. The descriptions are brief, scarcely more than diagnoses, but more detailed than those of an ordinary key. The illustrations are not of uniform excellence, but serve their purpose fairly well. They are conveniently inserted in the text which refers to them and are repeated when necessary. The book is a little large for use in the field, but for the actual work of identification at the study table it should be a most valuable aid, particularly to the beginner.

W. H. OSGOOD.

SCIENTIFIC JOURNALS AND ARTICLES.

The Journal of the Boston Society of Medical Sciences for June brings the fourth volume to a close and is accompanied by the index. The opening article on 'Pathological Changes affecting the Islands of Langerhans of the Pancreas' is by Eugene L. Opie, and 'The Influence of Defibrination on the Secretion of the Kidney' is discussed by Franz Pfaff and Vejux-Tyrode. 'A New Method of distinguishing Human from other Mammalian Blood in Medico-Legal Cases' is described by Ernest L. Walker, based upon the different characters of the granules of the polymorphonuclear leucocytes of the blood of various mammals and the ability to recognize these differences in dried blood by appropriate treatment and methods of staining. 'Some